IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	B. Kim et al.	Attorney Docket No.:	SEMT119849
Application No.:	10/700,782	Group Art Unit:	1753
Filed:	November 3, 2003	Examiner:	Edna Wong
Title:	BATH AND METHOD FOR HIGH RATE COPPER DEPOSITION		

INFORMATION DISCLOSURE STATEMENT

Seattle, Washington 98101

March 26, 2004

TO THE COMMISSIONER FOR PATENTS:

Applicants are aware of the information listed in the attached form that may be material to the prosecution of the above-identified patent application.

1. X Copies of the listed publications are enclosed for the Examiner's use.

2. X Pursuant to 37 C.F.R. § 1.97(b), this Information Disclosure Statement is being filed before the mailing date of a first Office Action on the merits.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service in a sealed envelope as first class mail with postage thereon fully prepaid and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below date.

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INFORMATION CITED BY APPLICANTS THAT MAY BE MATERIAL TO THE PROSECUTION OF THE SUBJECT APPLICATION

Applicants: B. Kim et al. Attorney Docket No. SEMT119849

Application No.: 10/700,782 Group Art Unit: 1753

Filed: November 3, 2003 Examiner: Edna Wong

Title: BATH AND METHOD FOR HIGH RATE COPPER DEPOSITION

U.S. PATENT DOCUMENTS

*Examiner Initials	Cite No.	Document No.	Kind Code	Date (mm/dd/yyyy)	Name
_____	U1	1,526,644	A	02/17/1925	Pinney
_____	U2	1,881,713	A	10/11/1932	Laukel
_____	U3	3,267,010	A	08/16/1966	Creutz et al.
_____	U4	3,328,273	A	06/27/1967	Creutz et al.
_____	U5	3,664,933	A	05/23/1972	Clauss
_____	U6	3,706,635	A	12/19/1972	Kowalski
_____	U7	3,716,462	A	02/13/1973	Jensen
_____	U8	3,770,598	A	11/06/1973	Creutz et al.
_____	U9	3,878,066	A	04/15/1975	Dettke et al.
_____	U10	3,930,363	A	01/06/1976	Polichette et al.
_____	U11	4,000,046	A	12/28/1976	Weaver
_____	U12	4,046,105	A	09/06/1977	Gomez
_____	U13	4,134,802	A	01/16/1979	Herr
_____	U14	4,272,335	A	06/09/1981	Combs
_____	U15	4,279,948	A	07/21/1981	Kukanskis et al.
_____	U16	4,304,641	A	12/08/1981	Grandia et al.
_____	U17	4,384,830	A	05/24/1983	Eckles
_____	U18	4,437,943	A	03/20/1984	Beck et al.
_____	U19	4,500,394	A	02/19/1985	Rizzo
_____	U20	4,576,689	A	03/18/1986	Makkaev et al.

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_____	U21	4,624,749	A	11/25/1986	Black et al.
_____	U22	4,634,503	A	01/06/1987	Nogavich
_____	U23	4,648,944	A	03/10/1987	George et al.
_____	U24	4,781,800	A	11/01/1988	Goldman et al.
_____	U25	4,828,654	A	05/09/1989	Reed
_____	U26	4,902,398	A	02/20/1990	Homstad
_____	U27	4,949,671	A	08/21/1990	Davis et al.
_____	U28	4,959,278	A	09/25/1990	Shimauchi et al.
_____	U29	4,988,533	A	01/29/1991	Freeman et al.
_____	U30	4,990,224	A	02/05/1991	Mahmoud
_____	U31	5,000,827	A	03/19/1991	Schuster et al.
_____	U32	5,021,129	A	06/04/1991	Arbach et al.
_____	U33	5,115,430	A	05/19/1992	Hahne et al.
_____	U34	5,116,430	A	05/26/1992	Hirai et al.
_____	U35	5,135,636	A	08/04/1992	Yee et al.
_____	U36	5,138,973	A	08/18/1992	Davis et al.
_____	U37	5,151,168	A	09/29/1992	Gilton et al.
_____	U38	5,161,168	A	11/03/1992	Schilling
_____	U39	5,209,817	A	05/11/1993	Ahmad et al.
_____	U40	5,217,586	A	06/08/1993	Datta et al.
_____	U41	5,256,274	A	10/26/1993	Poris
_____	U42	5,284,548	A	02/08/1994	Carey et al.
_____	U43	5,302,464	A	04/12/1994	Nomura et al.
_____	U44	5,344,491	A	09/06/1994	Katou
_____	U45	5,368,711	A	11/29/1994	Poris
_____	U46	5,372,848	A	12/13/1994	Blackwell et al.
_____	U47	5,376,176	A	12/27/1994	Kuriyama
_____	U48	5,391,285	A	02/21/1995	Lytle et al.
_____	U49	5,409,587	A	04/25/1995	Sandhu et al.

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_____	U50	5,443,865	A	08/22/1995	Tisdale et al.
_____	U51	5,472,502	A	12/05/1995	Lowery
_____	U52	5,472,592	A	12/05/1995	Lowery
_____	U53	5,482,891	A	01/09/1996	Shieh et al.
_____	U54	5,549,808	A	08/27/1996	Farooq et al.
_____	U55	5,576,052	A	11/19/1996	Arledge et al.
_____	U56	5,597,460	A	01/28/1997	Reynolds
_____	U57	5,639,316	A	06/17/1997	Cabral., Jr. et al.
_____	U58	5,674,787	A	10/07/1997	Zhao et al.
_____	U59	5,681,392	A	10/28/1997	Swain
_____	U60	5,684,713	A	11/04/1997	Asada et al.
_____	U61	5,695,810	A	12/09/1997	Dubin et al.
_____	U62	5,719,447	A	02/17/1998	Gardner
_____	U63	5,723,028	A	03/03/1998	Poris
_____	U64	5,723,387	A	03/03/1998	Chen
_____	U65	5,730,854	A	03/24/1998	Martin
_____	U66	5,750,018	A	05/12/1998	Brasch
_____	U67	5,754,842	A	05/19/1998	Minagawa
_____	U68	5,824,599	A	10/20/1998	Schacham-Diamand et al.
_____	U69	5,871,626	A	02/16/1999	Crafts et al.
_____	U70	5,882,498	A	03/16/1999	Dubin et al.
_____	U71	5,891,513	A	04/06/1999	Dubin et al.
_____	U72	5,897,368	A	04/27/1999	Cole, Jr. et al.
_____	U73	5,908,543	A	06/01/1999	Matsunami et al.
_____	U74	5,913,147	A	06/15/1999	Dubin et al.
_____	U75	5,932,077	A	08/03/1999	Reynolds
_____	U76	5,969,422	A	10/19/1999	Ting et al.
_____	U77	5,972,192	A	10/26/1999	Dubin et al.
_____	U78	5,989,397	A	11/23/1999	Laube et al.

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_____	U79	5,989,406	A	11/23/1999	Beetz, Jr. et al.
_____	U80	5,999,886	A	12/07/1999	Martin et al.
_____	U81	6,027,631	A	02/22/2000	Broadbent
_____	U82	6,028,986	A	02/22/2000	Song
_____	U83	6,036,836	A	03/14/2000	Peeters et al.
_____	U84	6,065,424	A	05/23/2000	Schacham-Diamand et al.
_____	U85	6,069,068	A	05/30/2000	Rathore et al.
_____	U86	6,074,544	A	06/13/2000	Reid et al.
_____	U87	6,090,260	A	07/18/2000	Inoue et al.
_____	U88	6,110,346	A	08/29/2000	Reid et al.
_____	U89	6,113,771	A	09/05/2000	Landau et al.
_____	U90	6,151,532	A	11/21/2000	Barone et al.
_____	U91	6,156,167	A	12/05/2000	Patton et al.
_____	U92	6,159,354	A	12/12/2000	Contolini et al.
_____	U93	6,162,344	A	12/19/2000	Reid et al.
_____	U94	6,162,488	A	12/19/2000	Gevelber et al.
_____	U95	6,179,983	B1	01/30/2001	Reid et al.
_____	U96	6,193,859	B1	02/27/2001	Contolini et al.
_____	U97	6,197,181	B1	03/06/2001	Chen
_____	U98	6,197,688	B1	03/06/2001	Simpson
_____	U99	6,199,301	B1	03/13/2001	Wallace
_____	U100	6,228,232	B1	05/08/2001	Woodruff et al.
_____	U101	2002/0042689	A1	06/20/2001	Chen
_____	U102	6,277,263	B1	08/21/2001	Chen
_____	U103	6,290,833	B1	09/18/2001	Chen
_____	U104	6,309,524	B1	10/30/2001	Woodruff et al.
_____	U105	6,319,831	B1	11/20/2001	Tsai et al.
_____	U106	2002/0000382	A1	01/03/2002	Morrissey et al.
_____	U107	2002/0008037	A1	01/24/2002	Wilson et al.

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_____	U108	6,344,129	B1	02/05/2002	Rodbell et al.
_____	U109	6,350,364	B1	02/26/2002	Jang
_____	U110	2002/0043466	A1	04/18/2002	Dordi et al.
_____	U111	2002/0043468	A1	04/18/2002	Mikkola et al.
_____	U112	6,391,166	B1	05/21/2002	Wang
_____	U113	2002/0066673	A1	06/06/2002	Rodbell et al.
_____	U114	2002/0102837	A1	08/01/2002	Ritzdorf et al.
_____	U115	6,565,729	B2	05/20/2003	Chen et al.

FOREIGN PATENT DOCUMENTS

*Examiner Initial	Cite No.	Document No.	Kind Code	Publication Date (mm/dd/yyyy)	Country	English Abstract Provided	English Translation Provided
_____	F1	GB 2 285 174		6/28/1995	GB		
_____	F2	JP 52-16433		07/30/1975	JP		X
_____	F3	WO 99/47731		09/23/1999	WO		
_____	F4	WO 02/45476	A2	06/13/2002	WO		

OTHER INFORMATION
(Including Author, Title, Date, Pertinent Pages, Etc.)

*Examiner Initial	Cite No.	
_____	O1	Benedetti, A.V., et al., "Electrochemical Studies of Copper, Copper-Aluminum and Copper-Aluminum-Silver Alloys: Impedance Results in 0.5M NaCl," *Electrochimica Acta 40*:2657-2668, March 1995.
_____	O2	Despić, A.R., "Deposition and Dissolution of Metals and Alloys, Part B: Mechanisms, Kinetics, Texture, and Morphology," in Brian E. Conway et al. (eds.), *Comprehensive Treatise of Electrochemistry Vol. 7: Kinetics and Mechanisms of Electrode Processes*, Plenum Press, New York and London, 1983, pp. 451-527.
_____	O3	Dubin, V., et al., *Copper Electroplating for On-chip Metallization*, Advanced Micro Devices, Sunnyvale, CA. No date available.

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_____ O4 Dubin, V.M., et al., "Copper Plating Techniques For ULSI Metallization," *Advanced Metallization and Interconnect Systems for ULSI Application in 1997, Proceedings of the Materials Research Society Symposium* , San Diego, , September 30-October 2, 1997, pp. 405-411.

_____ O5 Gignac, L.M., et al., "Characterization of Plated Cu Thin Film Microstructures," *Advanced Interconnects and Contacts, Vol. 564, Proceedings of the Material Research Society* , San Francisco, , April 5-7, 1999, pp. 373-434.

_____ O6 Graham, L., et al., "Steady-State Chemical Analysis of Organic Suppressor Additives Used in Copper Plating Baths," *Proceedings of The Electrochemical Society*, Honolulu, October 17-22, 1999, pp.

_____ O7 Kang, S., et al., "Relationship Between Texture and Surface Morphology of Copper Electrodeposits," *Plating & Surface Finishing*, pp. 67-70, October 1995.

_____ O8 Kelly, J.J., and A.C. West, "Copper Deposition in the Presence of Polyethylene Glycol: I. Quartz Crystal Microbalance Study," *J. Electrochem. Soc. 145*(10):3472-3481, October 1998.

_____ O9 Khera, R.P., "The Basic Principles of Electrolytic Deposition," *in Science and Technology of Surface Coating*, Academic Press, New York, 1974, pp. 69-84.

_____ O10 Krishnan, R.M., et al., "Electroplating of Copper From a Non-Cyanide Electrolyte," *Plating & Surface Finishing 82*(7):56-59, July 1995.

_____ O11 Lopatin, S., et al., "Extendibility of Ion-Metal Plasma and Electroplating Technologies for Damascene-Based Copper Metallization," *Proceedings of Advanced Metallization Conference*, Colorado, October 6-8, 1998, pp. 35-41.

_____ O12 Murarka, S.P., and S.W. Hymes, "Copper Metallization for ULSI and Beyond," *Critical Reviews in Solid State and Materials Sciences 20*(2):87-124, 1995.

_____ O13 Murarka, S.P., *Metallization: Theory and Practice for VLSI and ULSI*, Butterworth-Heinemann, Stoneham, Massachusetts, 1993.

_____ O14 Oskam, G., et al., "Electrochemical Deposition of Copper on n-Si/TiN," *J. Electrochem. Soc. 146*(4):1436-1441, 1999.

_____ O15 Reid, J.D., et al., "Impedance Behavior of Sulfuric Acid-Cupric Sulfate/Copper Cathode Interface," *J. Electrochem. Soc.: Electrochemical Science and Technology 134*(6):1389-1394, June 1987.

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_____ O16 Yung, E.K., and L.T. Romankiw, "Fundamental Study of Acid Copper Through-Hole Electroplating Process," *J. Electrochem. Soc. 136*(3):756-767, March 1989.

_____ O17 Yung, E.K., et al., "Plating of Copper into Through-Holes and Vias," *J. Electrochem. Soc. 136*(1):206-215, January 1989.

Examiner _____ Date Considered _____

*Examiner: Initial if reference considered, whether or not citation is in conformance with M.P.E.P. § 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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